Increased Incidence of Invasive Group A Streptococcal Infection In Indiana

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Invasive Group A *Streptococcus* infection (GAS) occurs when GAS, bacteria commonly found in the throat, invade other parts of the body, including blood and tissue. People with GAS will not automatically develop invasive infection. Invasive GAS infection usually develops when a person has a weakened immune system caused by other medical conditions or when the bacteria enter the bodies of otherwise healthy people, such as an opening in the skin can allow entry into deeper tissue.

Some strains of GAS may cause invasive disease in otherwise healthy individuals. In rare instances, these bacteria can cause severe and even life-threatening invasive disease, such as necrotizing fasciitis (NF), streptococcal toxic shock syndrome (STSS), bacteremia, and pneumonia. According to the Centers for Disease Control and Prevention (CDC), approximately 9,000 cases of invasive disease (3.2/100,000 population) occurred nationally in 2002. STSS and NF each accounted for approximately 6% of cases. Over 10 million noninvasive GAS infections (primarily throat and skin infections) occur annually in the U.S.

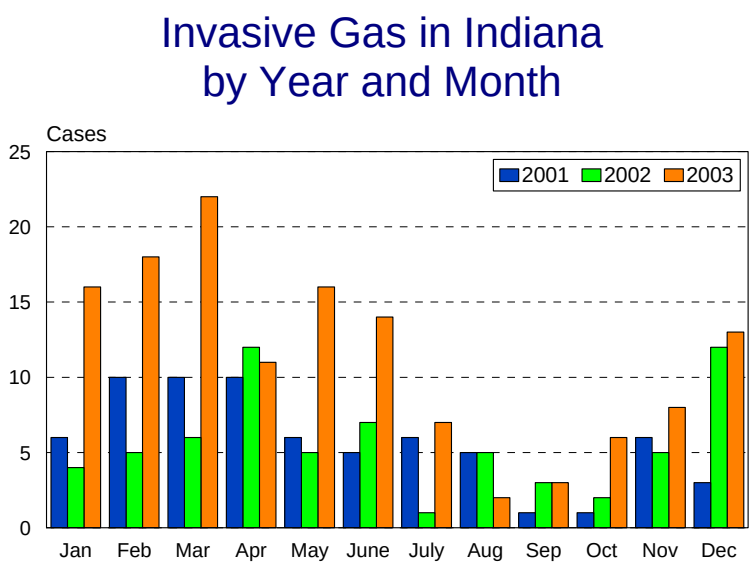
Incidence of Invasive GAS in Indiana

The number of cases of invasive GAS varies annually. As of October 2000, the Indiana State Department of Health requires physicians, hospitals, and laboratories to report Group A *Streptococcus* (*Streptococcus pyogenes)* invasive disease. This change in the reporting rule may have influenced the number of reported cases initially, however, little difference was observed when comparing 2001 and 2002 data.

In 2001, 69 cases were reported, and in 2002, 67 cases were reported, for an incidence rate of 1.09 cases per 100,000 population. In 2003, there was a sharp increase in cases: 136 cases were reported, for an incidence rate of 2.21. Though the incidence rate has doubled in Indiana, it remains below the national rate of 3.2 cases per 100,000 in 2002. No significant difference was noted in incidence in regard to gender. In 2003, blacks had a higher incidence than whites, 1.71 to 2.67 per 100,000, respectively. In 2003, the highest incidence rates were found in individuals under age 1 (7.05/100,000), those ages 70-79 (7.52/100,000), and those ages 80 and over (8.07/100,000).

Incidence of Reported Cases of Invasive GAS by Age Group in Indiana in 2003

Age Group	Number of Cases	Incidence Rate
<1	6	7.05
1-4	3	0.87
5-9	10	2.28
10-19	4	0.44
20-29	9	1.06
30-39	9	1.02
40-49	19	2.02
50-59	12	1.67
60-69	20	4.44
70-79	26	7.52
80+	17	8.07



How GAS Is Spread

- GAS is spread through direct contact with drainage from the nose or throat of an infected person or with infected wounds or sores on the skin.
- GAS is frequently seen in school-age children when school is in session. An environment which promotes transmission would be a large number of yelling, coughing, sneezing children in an enclosed area sharing food and drinks.
- People who carry the bacteria but have no symptoms are much less contagious.
- It is not likely that household items like plates, cups, or toys spread these bacteria.

Common Strep Illnesses

- **"Strep throat"**, the most common illness caused by GAS, is easily treated with a 10-day course of conventional antibiotics, usually penicillin. If left untreated or partially treated, however, it can be followed by rheumatic fever, which may result in permanent damage to the heart valves. Rheumatic fever, currently a rare disease, may occur when patients do not complete a full course of antibiotics to treat strep throat.
- **Impetigo** is the second most frequently occurring infection caused by GAS. This is a mild skin infection accompanied by open, draining sores. Complications are rare. It is easily treated with common antibiotics.
- **Scarlet Fever** is characterized by a fever, sore throat, red sandpaper-like rash, and a red "strawberry" tongue. It is caused by several different strains of streptococcal bacteria, all of which produce a toxin that causes the characteristic red rash. It is treated in the same manner as strep throat.

Invasive Infections

GAS comprises a number of strains of bacteria that can produce a wide range of illnesses. Some, like "strep throat" and impetigo, are quite common and easily treated. Others, including those referred to as invasive disease, are more rare and require immediate medical attention. Certain strains of Group A bacterium can lead to several forms of invasive disease, including pneumonia, meningitis, infection of the bone, and an illness resembling toxic shock syndrome.

Necrotizing Fasciitis

Necrotizing fasciitis is the medical term for a serious skin and muscle infection caused by certain strains of GAS. These bacteria can destroy tissue. Though it occurs in less than 10 percent of the persons who develop an invasive GAS infection, it can be fatal in 20% to 30% of these cases. Not everyone infected with this bacterium will become ill, although the reason for this is unknown. Because of the amount of tissue damage seen with this kind of infection, physicians at times will use multiple antibiotics along with the surgical removal of severely damaged skin and muscle tissue.

Diagnosis

Healthcare providers are unable to say with certainty that a person has GAS without additional laboratory testing. Noninvasive procedures can be done in the office to test for GAS. A swab is used to collect fluids from the back of the throat or skin for such tests. One test can offer results within minutes and the other takes a couple of days.

- The rapid antigen test takes only 15-30 minutes. If the test is positive for GAS, the diagnosis is confirmed; however, a negative test does not always mean a person does not have GAS infection. Rapid tests have an error rate of about 10-20%.
- If the rapid test is negative, a culture is sent to the lab for further testing. Results are usually obtained in 48-72 hours, and the diagnosis confirmed if GAS is found.

Treatment

- GAS bacteria are known to be sensitive to penicillin, so it is the preferred antibiotic for most types of streptococcal infections.
- Necrotizing fasciitis is more effectively treated with penicillin in combination with clindamycin, or another antibiotic, and surgery.
- Treating infected persons with an antibiotic for 24 hours or longer generally eliminates their ability to spread the bacteria.
- It is important to complete the full course of antibiotics as prescribed.

Prevention of GAS Infection

The spread of all types of GAS infections may be reduced by:

- Completing the course of antibiotics as prescribed
- Covering one’s mouth and nose when coughing or sneezing

- Washing hands after coughing or sneezing
- Washing hands before preparing foods and before eating
- Avoiding the sharing of food or drinks

- Persons with sore throats should be seen by a doctor who can perform tests to determine whether the illness is caused by "strep throat". If test results are positive, the person should stay home from work, school, or day care for at least 24 hours after beginning antibiotic treatment.
- Cleaning and covering wounds.
- If a person has an infection (redness or inflammation around a wound) in which the reddened area becomes progressively larger, he/she should see a healthcare provider as soon as possible.

For more information on invasive GAS disease, contact your local health department or call the Indiana State Department of Health at 317-234-2804.

Additional Reading

***Streptococcus pyogenes emm* Sequence Database**
http://www.cdc.gov/ncidod/biotech/strep/strepindex.htm

NIH Information
http://www.niaid.nih.gov/factsheets/strep.htm
http://www.cdc.gov/ncidod/EID/vol1no3/stevens.htm

Healthcare Provider Information
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_t.htm
http://aepo-xdv-www.epo.cdc.gov/wonder/prevguid/tp_00863.htm - Prevention Guidelines for Streptococcal Infections (also includes Group A and Group B streptococcal infections)
http://www.cdc.gov/ncidod/EID/vol1no3/stevens.htm - Streptococcal Toxic-Shock Syndrome: Spectrum of Disease, Pathogenesis, and New Concepts in Treatment, 9/95
http://wonder.cdc.gov/wonder/prevguid/p0000446/entire.htm - Guideline for Infection Control in Hospital Personnel, 7/83

Media Information
http://www.bcm.tmc.edu/oto/grand/123192.html - Necrotizing fasciitis of the head and neck - Case study for teaching purposes - Baylor College of Medicine/Houston, TX
http://www.cdc.gov/ncidod/EID/vol2no1/strepyro.htm - Trends in Bacteremic Infection Due to Streptococcus pyogenes (Group A Streptococcus), 1986-1995, 3/96
http://www.cdc.gov/ncidod/hip/abc/facts39.htm - CDC's "The ABCs of Safe and Healthy Child Care" - information on strep throat and scarlet fever

Laboratory Information
http://www.cdc.gov/ncidod/EID/vol5no2/hoe.htm - Rapid Molecular Genetic Subtyping of Serotype M1 Group A Streptococcus Strains, 4/99
http://www.socgenmicrobiol.org.uk/MIC/146/1195/1461195A.PDF emm and sof gene sequence variation in relation to serological typing of opacity-factor-positive group A streptococci

Outbreak Information
http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00049535.htm - MMWR Outbreak of Invasive Group A Streptococcus Associated with Varicella in a Childcare Center -- Boston, Massachusetts, 1997 2.

http://www.cdc.gov/nchstp/tb/pubs/mmwr/mm4718.pdf - Varicella related deaths among children - United States - 1997, 5/98

http://www.cdc.gov/ncidod/EID/vol2no1/strepyro.htm - Trends in Bacteremic Infection Due to Streptococcus pyogenes (Group A Streptococcus), 1986-1995, 3/96

http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00056612.htm - March 05, 1999 / 48(08);163-166. Nosocomial Group A Streptococcal Infections Associated with Asymptomatic Health-Care Workers -- Maryland and California, 1997